O1o1o1o -Logic/non logic gender of nOise- oooo1o1o1o1o1o1o1o1oo1

Some important things to take under account :

During the workshop you will hear a lots of terms that you might be or might not be familiar with. In any case it helps to clear out the terms, so we made a short glosary of terms:

An **integrated circuit** or **monolithic integrated circuit** (also referred to as an **IC**, a **chip**, or a **microchip**) is a set of electronic circuits on one small plate ("chip") of semiconductor material, normally silicon. This can be made much smaller than a discrete circuit made from independent components.

Integrated circuits are used in virtually all electronic equipment today and have revolutionized the world of electronics.

ICs can be made very compact, having up to several billion transistors and other electronic components in an area the size of a fingernail.

Ohm's law states that the current through a conductor between two points is directly proportional to the potential difference across the two points.

$$P = V * I \qquad I = \frac{P}{V}$$

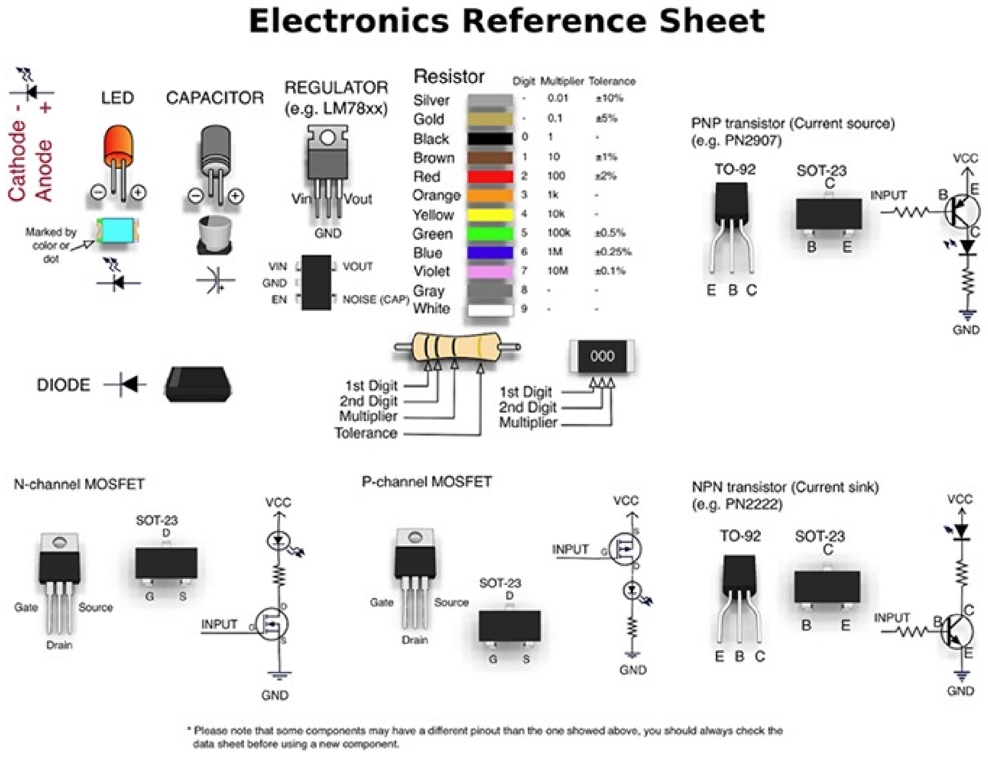
$$V = I * R \qquad I = \frac{V}{R}$$

WWW.INVENTABLE.EU

where I is the current through the conductor in units of amperes, V is the potential difference measured across the conductor in units of volts, and R is the resistance of the conductor in units of ohms. More specifically, Ohm's law states that the R in this relation is constant, independent of the current.

I= amperes
V= volts
R= Ohms

- **resistance is the inverse of conductance.** R=1/C
- Resistors, condensers, inductors, are pasive elements. The are use together as frequency determining circuits.
- **Resistor** is a passive electric element that "burns" electric energy. It is used for **setting the voltage drops**, it limits/defines the electric current.
- Diferents resistors:
  a) **normal resistor** (with fixed value depend of the colours of the lines)
  b) **POT** (potentiometer o variable resistor)
  c) **LDR** (light dependent resistor)
- **Capacitor/ condenser** : is a passive two-terminal electrical component used to store energy electrostatically in an electric field. It is used to keep an amount of energy (as electrons) for alternate current. It shows frequency dependent resistance: the higher the frequency the less resistance. (Xc = L/ wC).
- **Led:** is a light emiting diode.

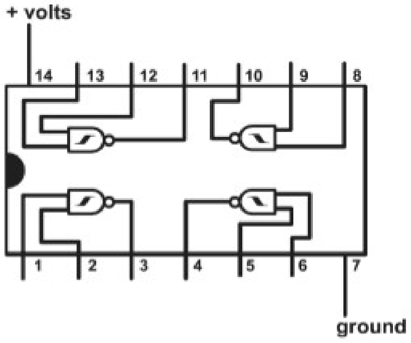


Resistor	Digit	Multiplier	Tolerance
Silver	-	0.01	±10%
Gold	-	0.1	±5%
Black	0	1	-
Brown	1	10	±1%
Red	2	100	±2%
Orange	3	1k	-
Yellow	4	10k	-
Green	5	100k	±0.5%
Blue	6	1M	±0.25%
Violet	7	10M	±0.1%
Gray	8	-	-
White	9	-	-

* Please note that some components may have a different pinout than the one showed above, you should always check the data sheet before using a new component.

NanD Gate Smith Trigger // synthetizer ! !

This experiment is based on an example in Nicolas Collins’ book: “Handmade Electronic Music, The Art of Hardware Hacking”. The motivation for this experiment is to learn IC logic chips and to prepare inexpensive experiments for sound making electronics workshops.
The IC 4093 may not have complicated specifications and attributes yet it proposes many useful utilities. It consists of some fundamental blocks which can be configured according to personal preferences and used for numerous different applications



CD4093 Quad NAND Gate

The misuse of Quad NAND Gate 4093 chip makes simple & cheap way to synthesise modulating square waves. Misuse, since the 4093 chip was not designed to make sounds but to do boolean logic, as a member of highly successful CMOS 4000 series IC chips form late sixties.

IC 4093 :
It consists of 14 pins and has four CMOS blocks internally embedded inside its package.
These blocks are called gates, here these are termed NAND gates.

A single NAND gate has two inputs and one output. The 4093 chip has four NAND gates, hence the name QuadNAND gate. The NAND stands for one of the common boolean logics (Not AND) where two input states, highs(ones) or lows(zeros), define the state of the output. In NAND case, if neither of inputs are high (being low) the output keeps high. If both of the inputs are pulled high the output inverts to low. If one of the inputs is low the output is always high. The chip uses Scmitt Trigger comparators, which provides noisless & direct swapping of the states.

A NAND (NOT+AND) gate adds an inverter stage after the AND logic to flip the output like this:

Input A	Input B	Output
0	0	1
1	0	1
0	1	1
1	1	0

To turn this to sound it helps to understand basics of the sound. To put it very short, when there is changing states there is frequency. If the frequency oscillates through air and is in the range of hearing, there is sound. If we do the above mentioned state swapping we generate oscillation, a square wave signal of highs and lows, which can be amplified and heard.

Basic square wave can be made with just one NAND gate. The first input is connected high(+5 to 15V) the second is connected low(GND) via capacitor and the output is fed back to the second input via resistor. The chain of events in a fast loop:

- input 1 is driven high, the input2 is low, making the output high
- the high output recharges the capacitor in time affected by the feedback resistor
- charged capacitor pulls the input2 high, output goes low, capacitor discharges
- back to the beginning

The frequency generated is based on the capacitance and resistance of the components menitoned above. Increasing the resistance with eg. a potentiometer, less current will flow to capacitor, slowing the “swapping”, lowering the pitch. The higher the capacitance, the longer it takes to recharge, forcing the range of the sweeping pitch lower. This experiment uses 100k pots with 0.1uF and 2.2uF caps. The big cap keep the range very low, in rhythmic clicks, where the small one takes the range high in clear pitch frequencies.

NAND gates can modulate each other. By connecting the output of gate1 to the input1 of gate2, the swapping high-low cycle enables and disables the second gate very fast while the the second gate produces its own frequencies. This can be fed further to the gate3 and so on. This results to complex square wave modulations worth experimenting so read on.

Using it

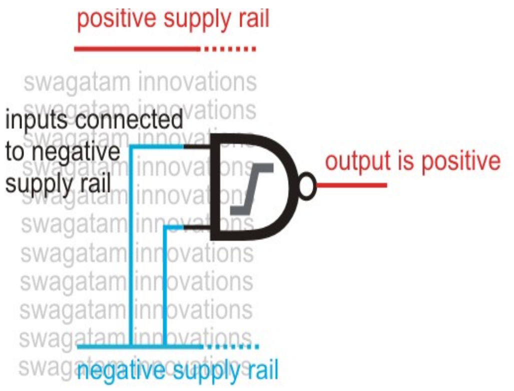
Start with the first gate, varying the resistance between pins2&3. Take the audio out from header in pin3. Try the difference with a jumper enabling the bigger cap in gate1. Move to gate1 modulating gate2. Put another pot between pins 4&5 and move the audio out signal to pin4 (gate2 output). Experiment with the pots and cap jumpers. Carry on to gate3 and gate4.

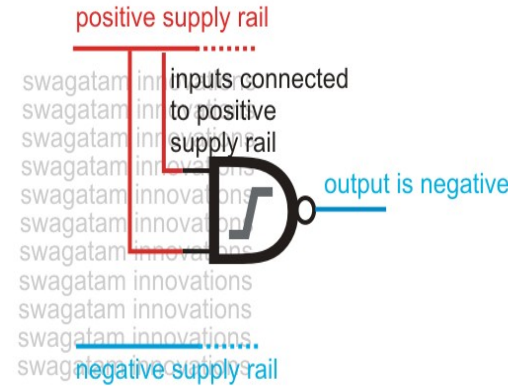
How the truth table is operation into the gates.

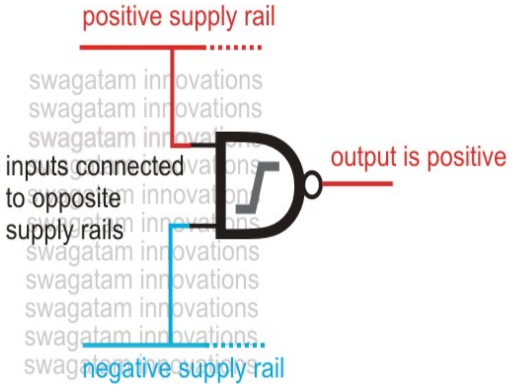
Truth table (theoretical)

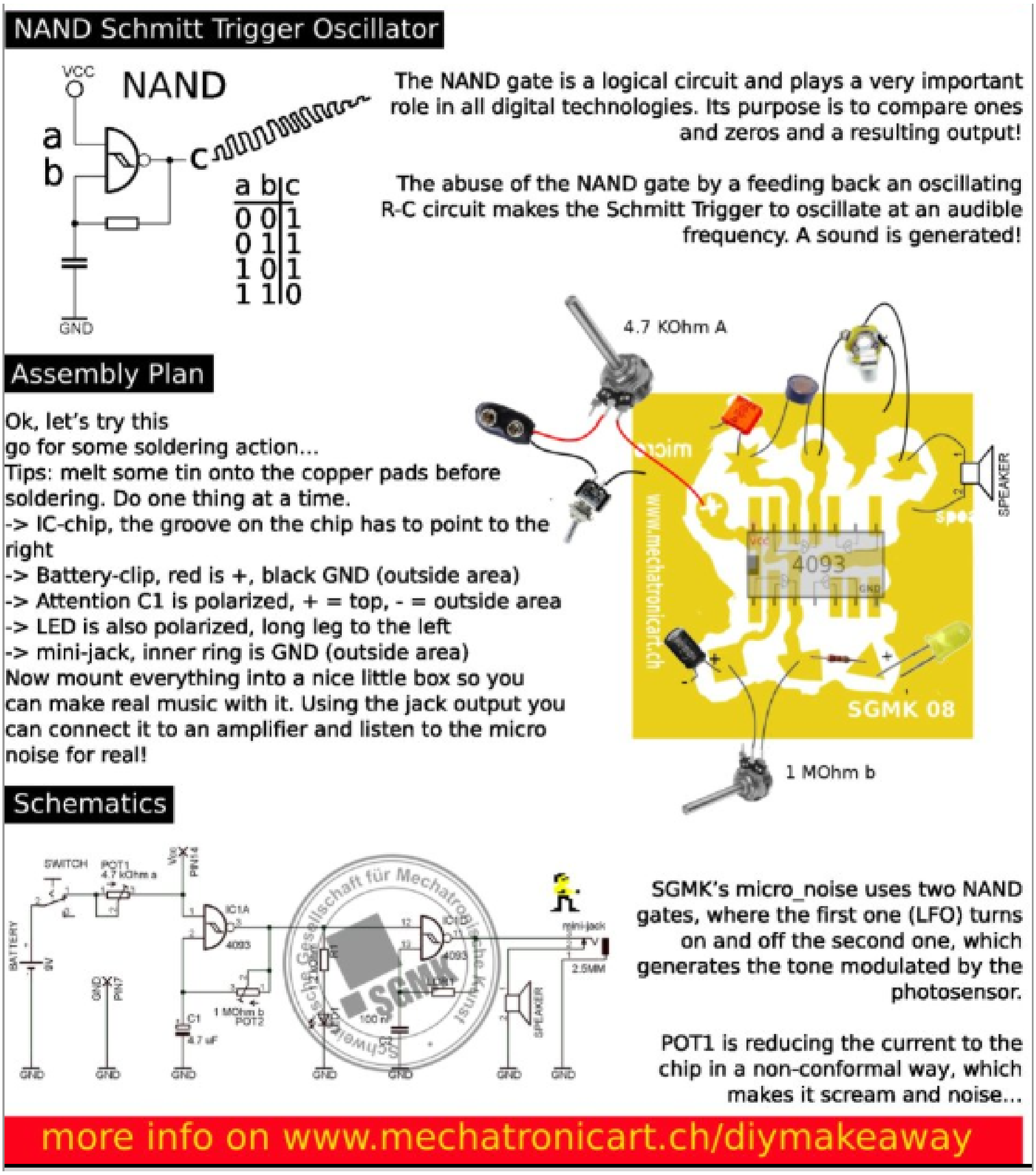
Input A	Input B	Output
0	0	1
1	0	1
0	1	1
1	1	0

into the fisical wordl









NAND Schmitt Trigger Oscillator

a	b	c
0	0	1
0	1	1
1	0	1
1	1	0

The NAND gate is a logical circuit and plays a very important role in all digital technologies. Its purpose is to compare ones and zeros and a resulting output!

The abuse of the NAND gate by a feeding back an oscillating R-C circuit makes the Schmitt Trigger to oscillate at an audible frequency. A sound is generated!

Assembly Plan

Ok, let's try this
go for some soldering action...
Tips: melt some tin onto the copper pads before soldering. Do one thing at a time.
-> IC-chip, the groove on the chip has to point to the right
-> Battery-clip, red is +, black GND (outside area)
-> Attention C1 is polarized, + = top, - = outside area
-> LED is also polarized, long leg to the left
-> mini-jack, inner ring is GND (outside area)
Now mount everything into a nice little box so you can make real music with it. Using the jack output you can connect it to an amplifier and listen to the micro noise for real!

Schematics

SGMK's micro_noise uses two NAND gates, where the first one (LFO) turns on and off the second one, which generates the tone modulated by the photosensor.

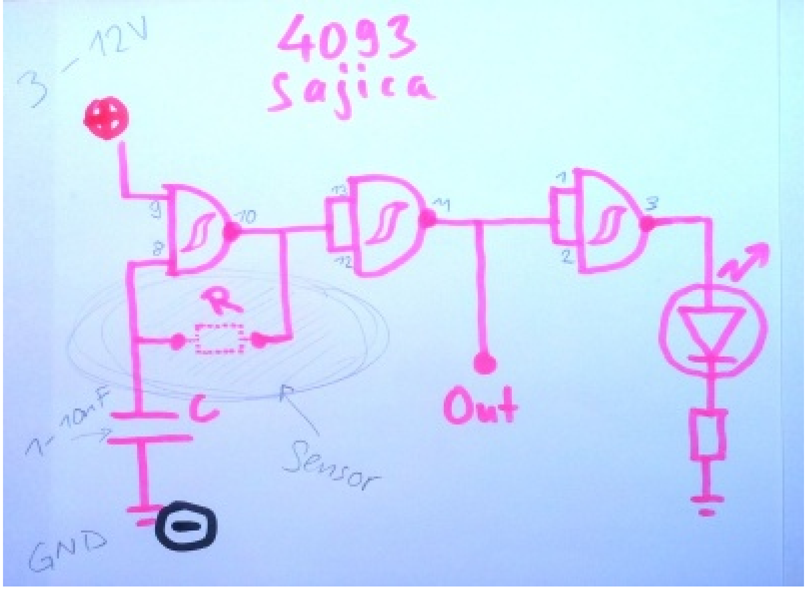
POT1 is reducing the current to the chip in a non-conformal way, which makes it scream and noise...

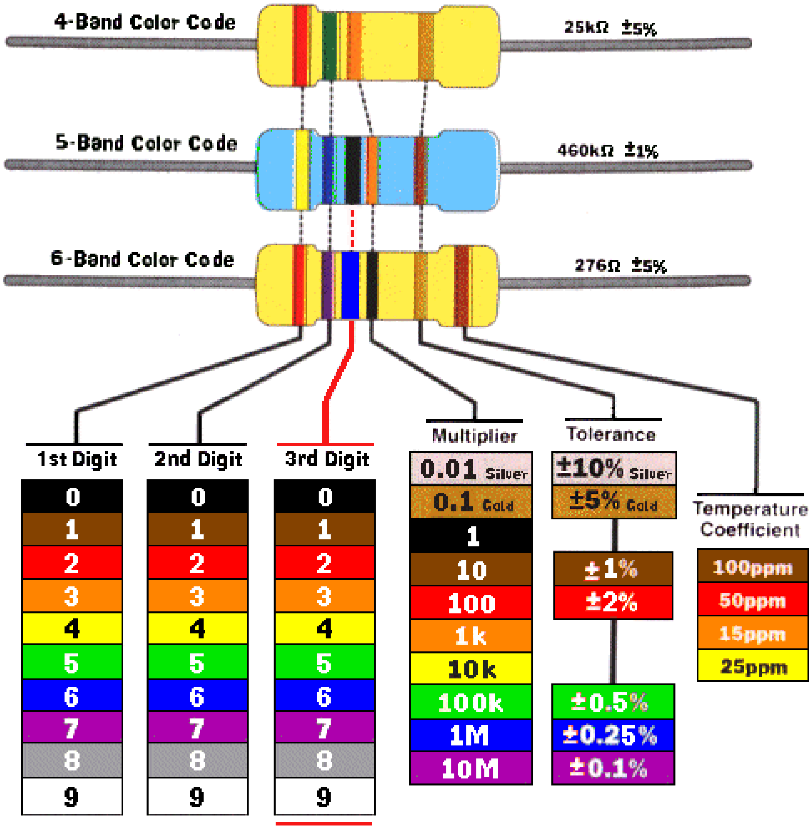
more info on www.mechatronicart.ch/diymakeaway

mechatronic-art example

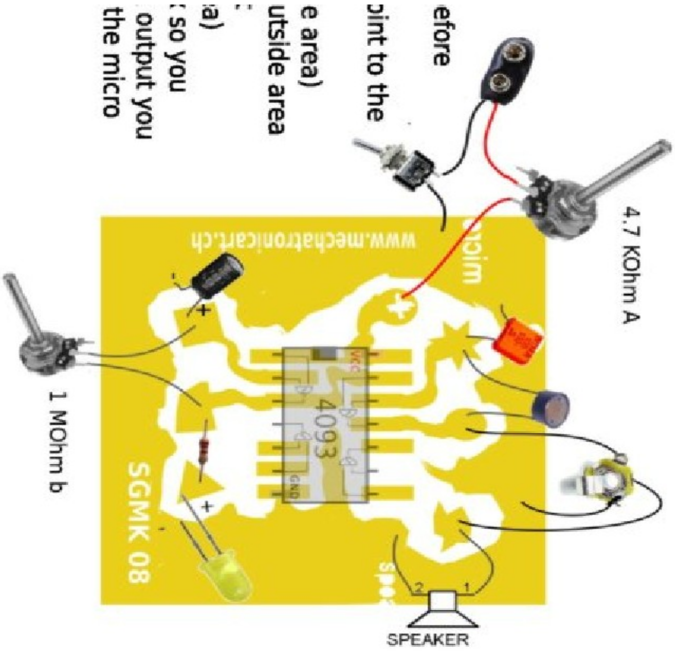
this is a simple type of double LFO (low frecuency oscillator)and light dependent audio frequency oscillator (OSC); whereby the later sinal is modulated by the former. That means that OSC is modulated by the LFO; It produces a two chanel audio.

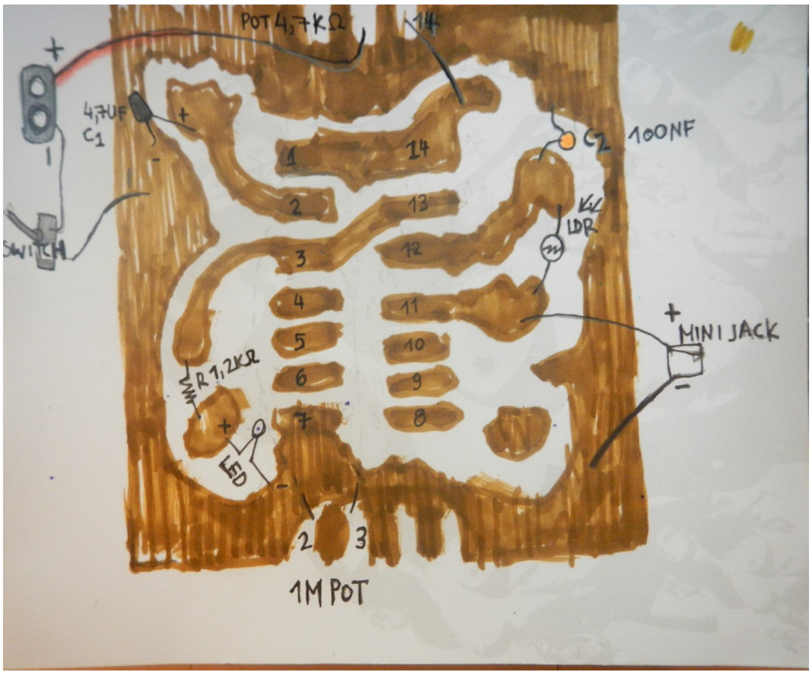
VIVe la resistence



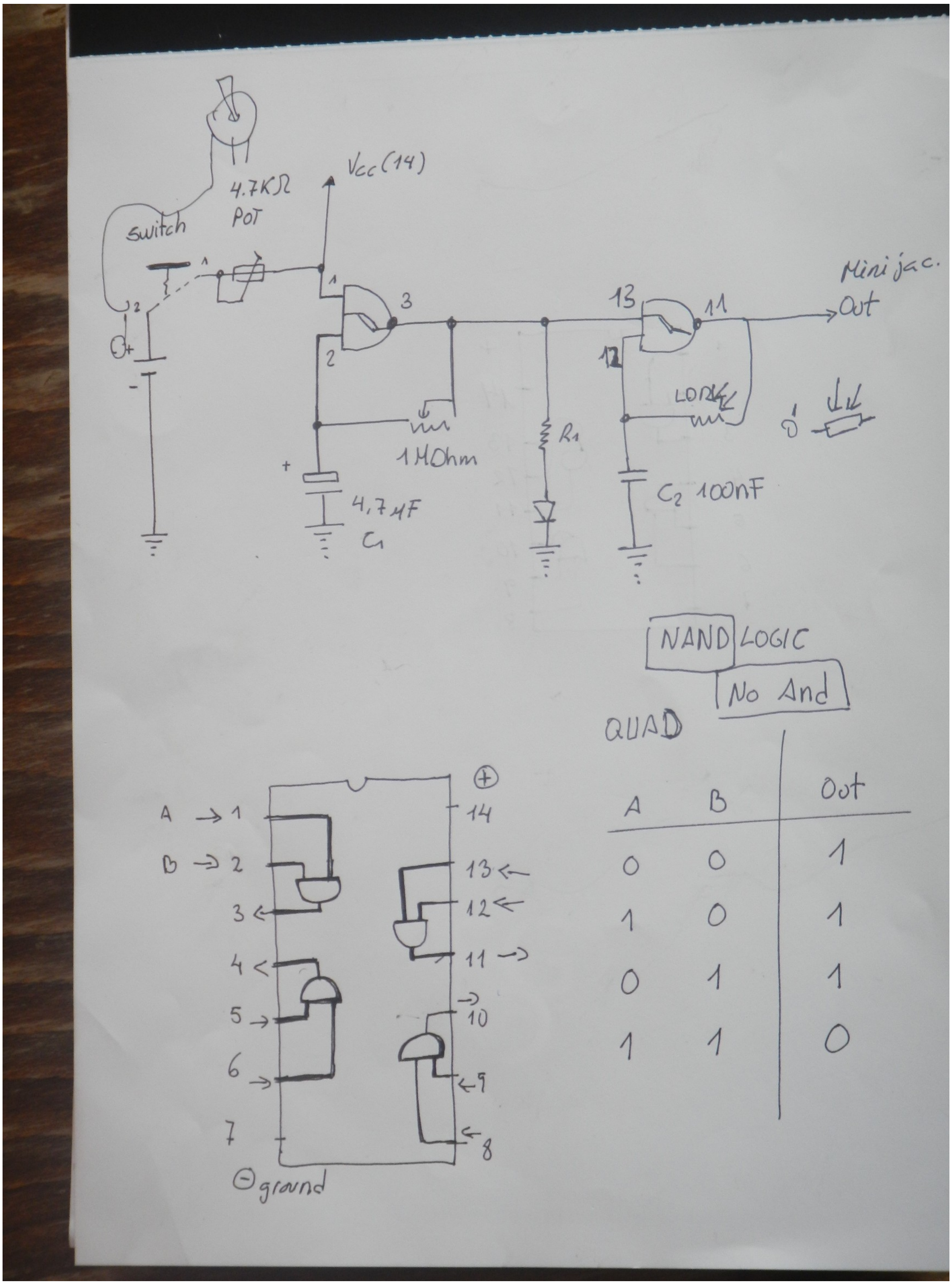


1st Digit	2nd Digit	3rd Digit	Multiplier	Tolerance	Temperature Coefficient
			0.01 Silver	±10% Silver	
			0.1 Gold	±5% Gold	
0	0	0	1		
1	1	1	10	±1%	100ppm
2	2	2	100	±2%	50ppm
3	3	3	1k		15ppm
4	4	4	10k		25ppm
5	5	5	100k	±0.5%	
6	6	6	1M	±0.25%	
7	7	7	10M	±0.1%	
8	8	8			
9	9	9			


efore
oint to the
e area)
utside area
a)
: so you
output you
the micro
4.7 KOhm A
micro
www.mechatronicart.ch
4093
VCC
GND
1 MOhm b
SGMK 08
1
2
SPEAKER


POT 4,7KΩ
14
+
-
4,7UF
C1
SWITCH
C2
100NF
LDR
+
MINI JACK
-
R 1,2KΩ
LED
1
2
3
4
5
6
7
8
9
10
11
12
13
14
2
3
1M POT

this is a simple type of double LFO (low frecuency oscillator)and light dependent audio frequency oscillator (OSC); whereby the later sinal is modulated by the former. That means that OSC is modulated by the LFO; It produces a two chanel audio



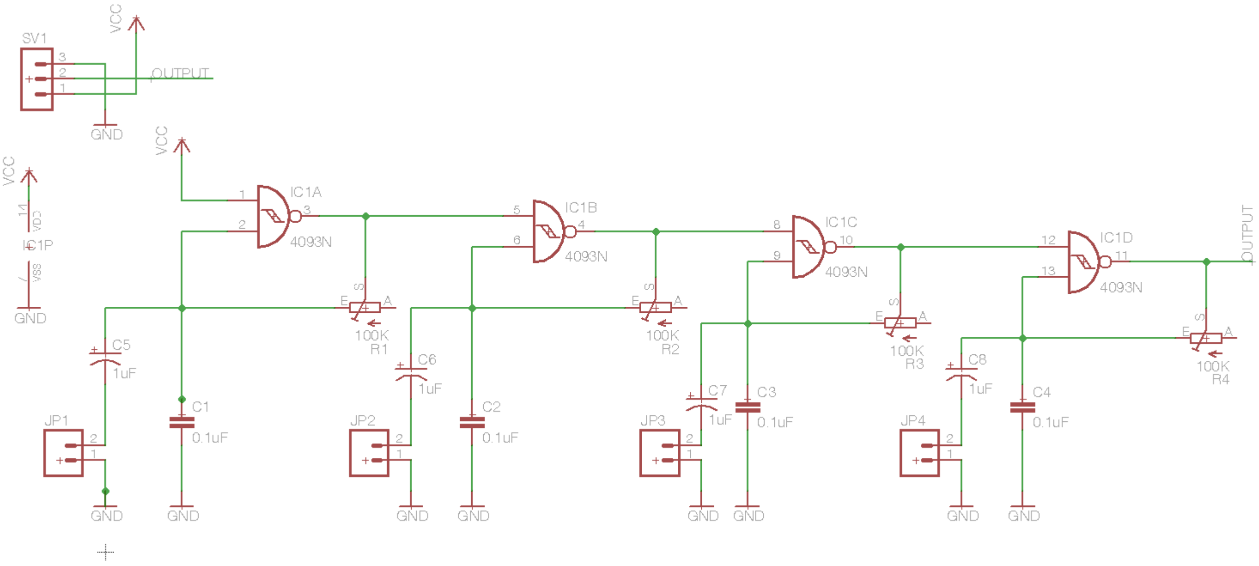
NAND LOGIC

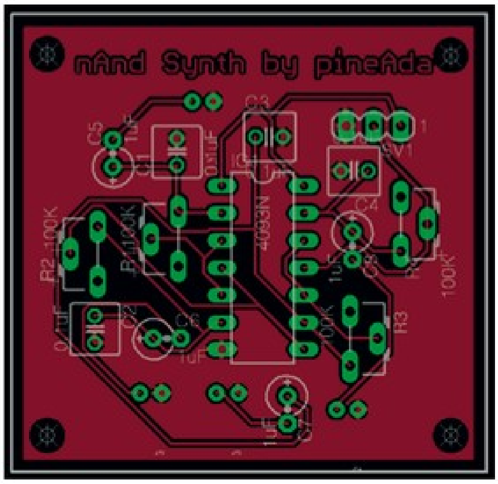
No And

QUAD

A	B	Out
0	0	1
1	0	1
0	1	1
1	1	0

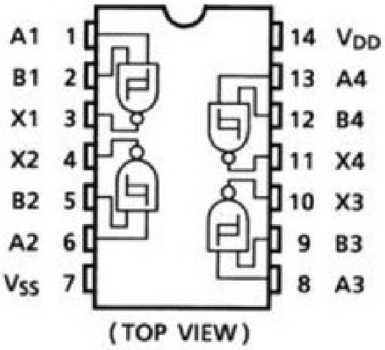
Another version of NaNd Gate logic with 4 gates in action





CMOS Quad NAND Gate Schmitt Trigger Integrated Circuit(CD4093)

Pin Assignment



El sintetizador 4093 NAND es un generador de ruido súper modificable con una enorme cantidad de potencial sonoro ! Aviones no tripulados de baja pulsación, el caos robótico del azar y los sonidos agudos láser - todo aquí en este pequeño kiT; perfecto para comenzar a explorar la síntesis sonora !!!

El Kit NAND /synth incluye: 4 potenciómetros (resistencias variables) de 100 KΩ, 4 condensadores electrolíticos de 1μF(con polaridad), 4 condensadores cerámicos 0.1μF, 4 switch on/of (interruptor de palanca) , adaptador para pila de 9V y salida de audio Jack hembra.

LM386 Low Voltage Audio Power Amplifier

General Description

The LM386 is a power amplifier designed for use in low voltage consumer applications.
The gain is internally set to 20 to keep external part count low, but the addition of an external resistor and capacitor between pins 1 and 8 will increase the gain to any value up to 200.
The inputs are ground referenced while the output is automatically biased to one half the supply voltage. The quiescent power drain is only 24 milliwatts when operating from a 6 volt supply, making the LM386 ideal for battery operation.

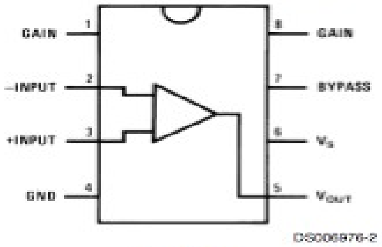
Features:

- Battery operation
- Minimum external parts
- Wide supply voltage range
- Low quiescent current drain
- Voltage gains from 20 to 200
- Ground referenced input
- Self-centering output quiescent voltage
- Low distortion
- Available in 8 pin MSOP package

Applications:

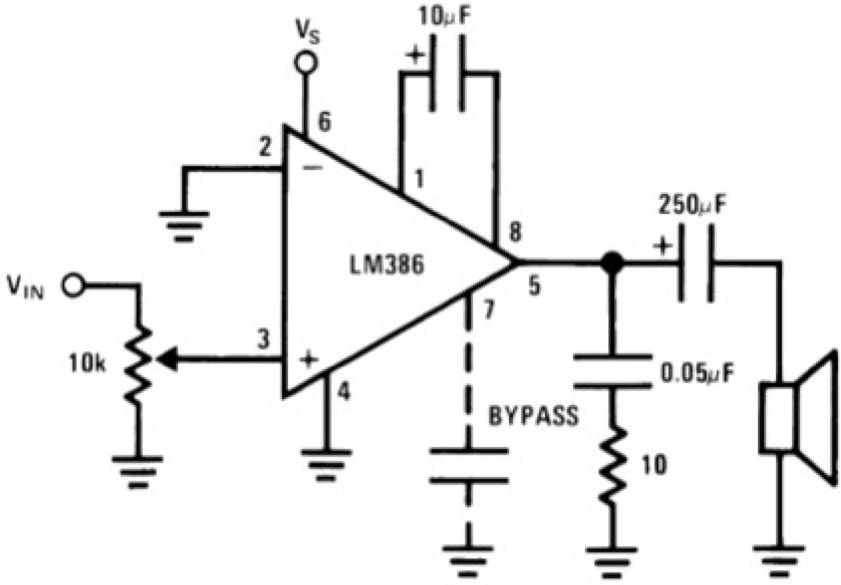
- AM-FM radio amplifiers
- Portable tape player amplifiers
- Intercoms
- TV sound systems
- Line drivers
- Ultrasonic drivers
- Small servo drivers
- Power converters

Small Outline, Molded Mini Small Outline, and Dual-In-Line Packages

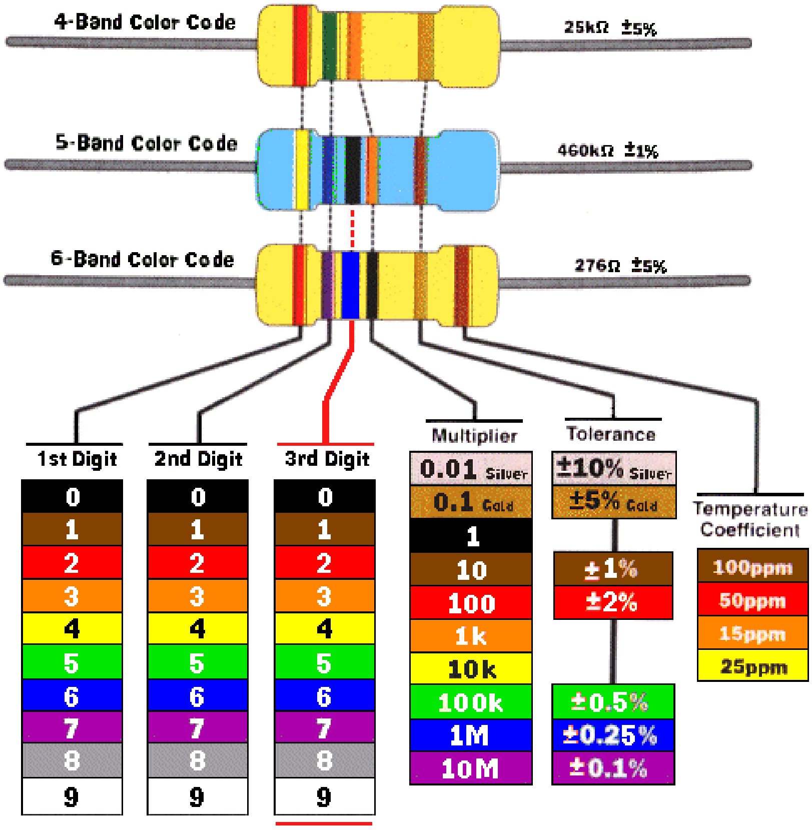


Top View
Order Number LM386M-1, LM386MM-1, LM386N-1, LM386N-3 or LM386N-4
See NS Package Number M08A, MUA08A or N08E

Amplifier with Gain = 200



DS006976-4



there is more examples that we can build ! !

electromagnetic amplifier

amplifier with square wave

copper coil to hear electromagnetic fields

galvanic sensors for humans and plants

simple theremin

hex inverter

piezos

effect …. . . . ..

. ..

. .. . .

. . . .

KaOs Glam

El circuito se compone de una pcb diseñada con la intención de ser los pads o dibujos de medusas las partes activas mediate las cuales y através del contacto corporal inducimos biofeedback al conjunto.

Basado en el principio de Bending (interacción de cuerpo con el circuito electrónico)

Caracteriswticas y funciones:

Touch control
Two oscillators
Distortion
Feedback network
Filter
Interference/hum/radio ...

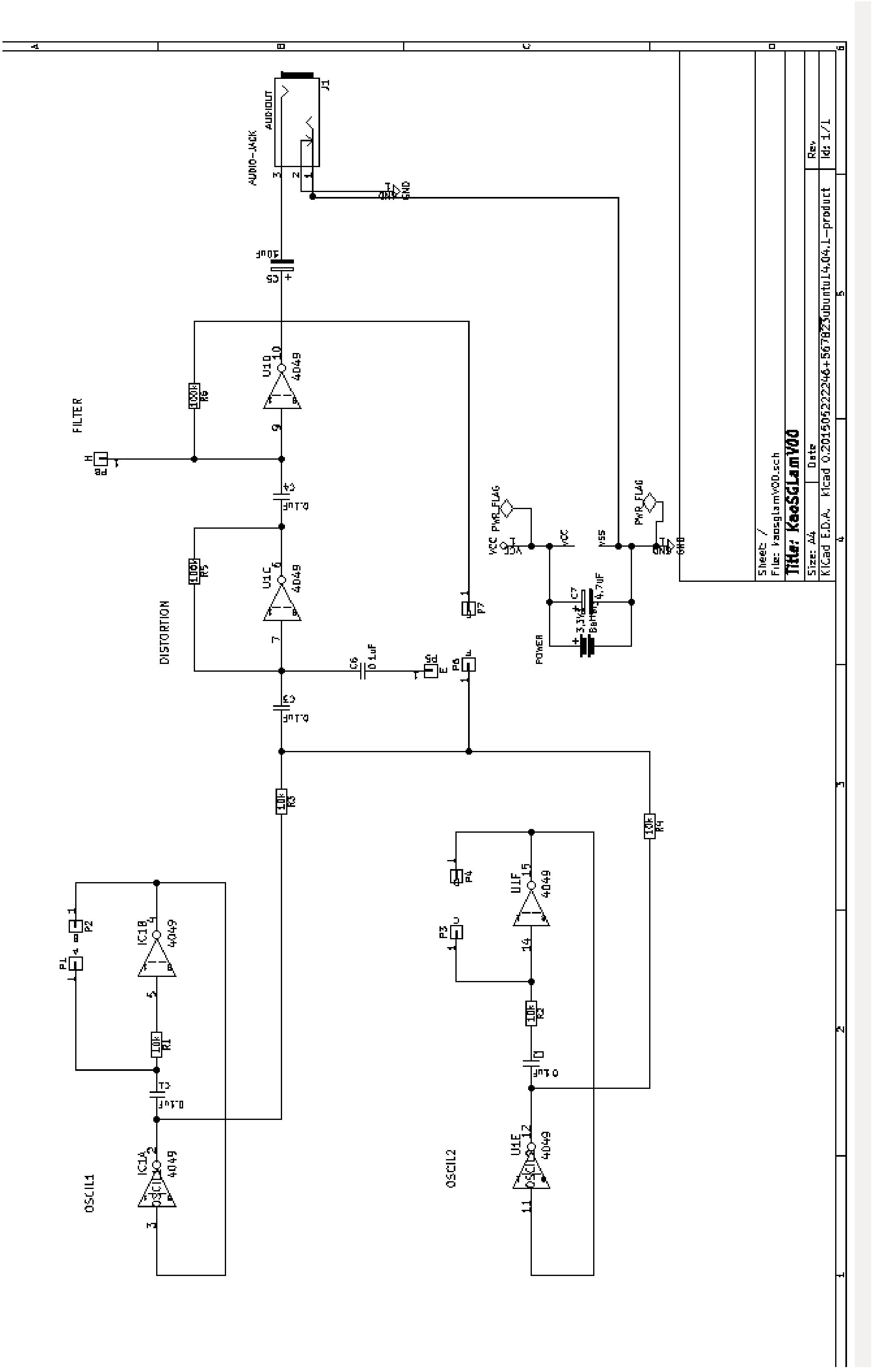
inspiración y refrencias para su desarrollo

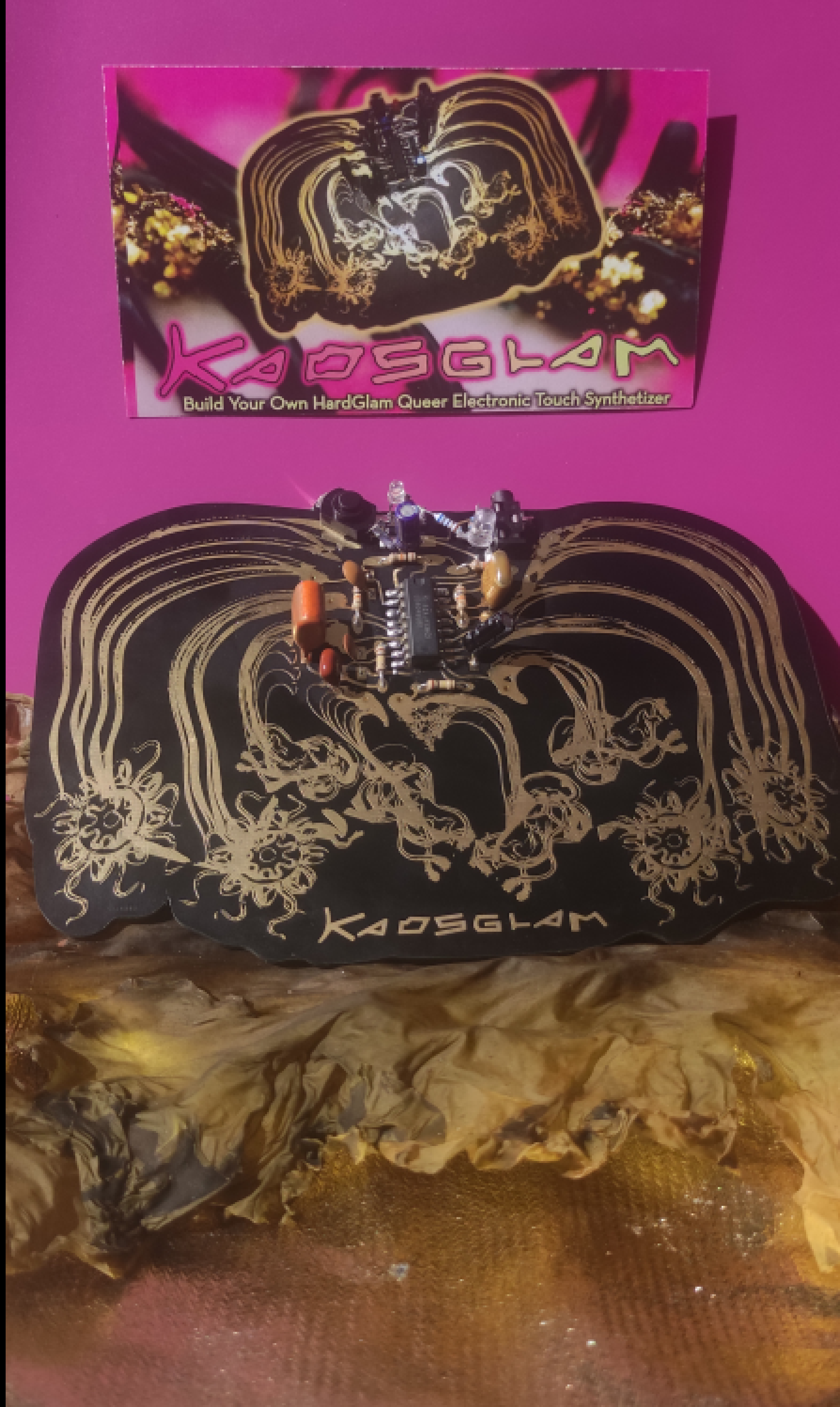
Craig Anderton, Michel Waisvisz, the Crackle Box, David Tudor, Hue Davies, Scratch Orchestra, Nicolas Collins, Merzbow, Tom Bugs, Tristan Perich, Stanley Lunetta and Dirty electronics.

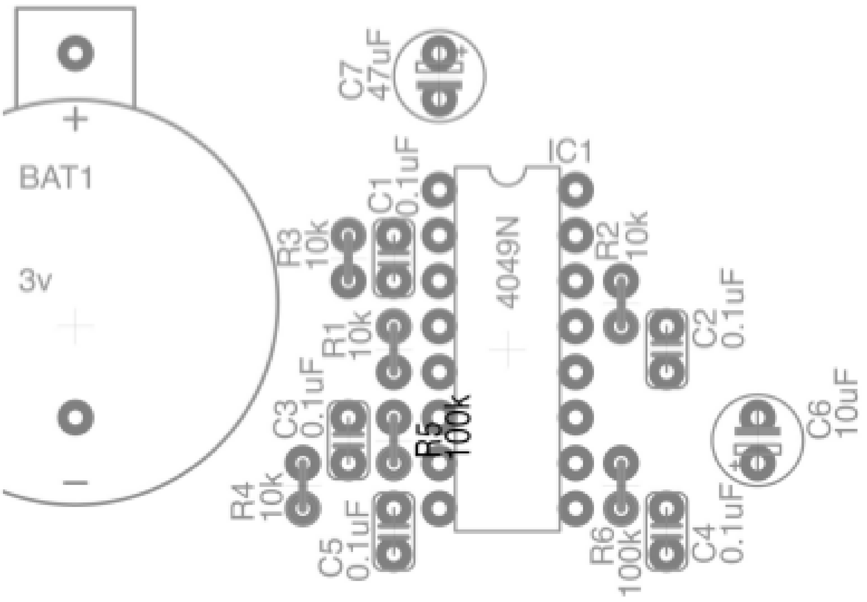
Libros de consulta y aprendizaje

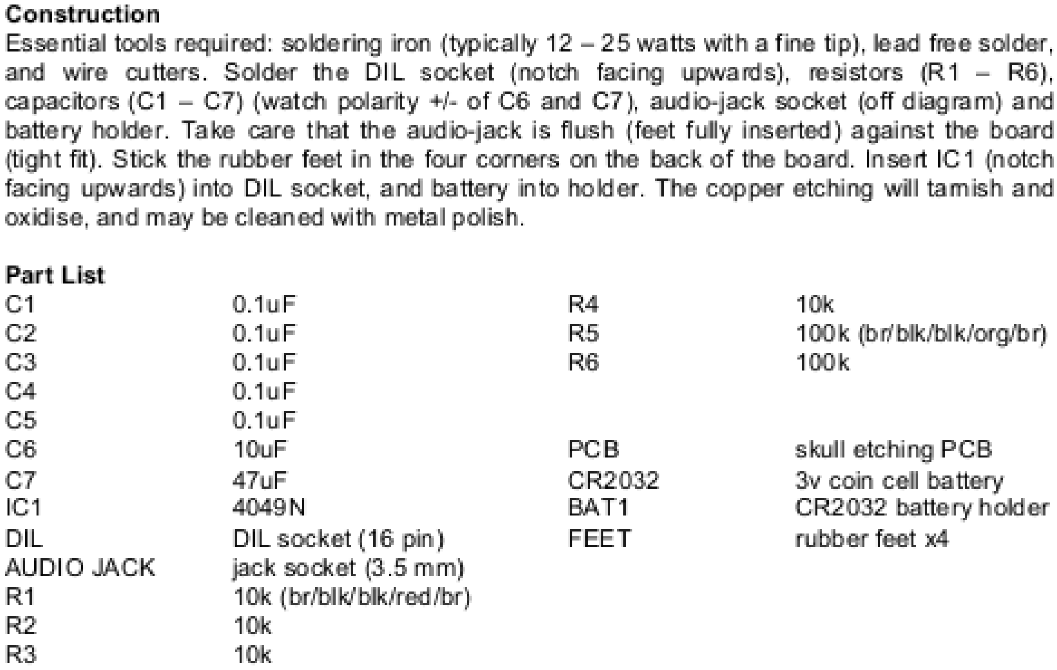
Anderton, Craig. Electronic Projects forMusicians. New York: AMSCO, 1980.
Brindley, Keith. Starting Electronics.Amsterdam: Elsevier/Newnes, 2005.
Collins, Nicolas. Handmade Electronic Music: The Art of Hardware Hacking.
New York [etc.]: Routledge, 2006.Lancaster, Don.
CMOS Cookbook.Indianapolis: H.W. Sams, 1977
Richards, John. “Getting the Hands Dirty,”
Leonardo Music Journal (18) 2008.
Richards, John. Nine Easy Pieces for the Sudophone. 2009.

KaOs Glam


Sheet: /
File: kaosglamV00.sch
Title: KaoSGlamV00
Size: A4
Date
Rev
Id: 1/1
KiCad E.D.A. kicad 0.201505222246+5678~25~ubuntu14.04.1-product
AUDIO-JACK
AUDIOUT
J1
GND
C5
10uF
U1D
4049
R6
100k
FILTER
P8
C3
0.1uF
U1C
4049
R5
100k
DISTORTION
C6
0.1uF
P6
P5
P7
C2
0.1uF
R3
10k
R4
10k
PWR_FLAG
VCC
VSS
C7
4.7uF
3.3V
Battery
POWER
IC1A
4049
IC1B
4049
R1
10k
C1
0.1uF
P1
P2
OSCIL1
U1E
4049
U1F
4049
R2
10k
P3
P4
OSCIL2


KAOSGLAM
Build Your Own HardGlam Queer Electronic Touch Synthetizer
KAOSGLAM





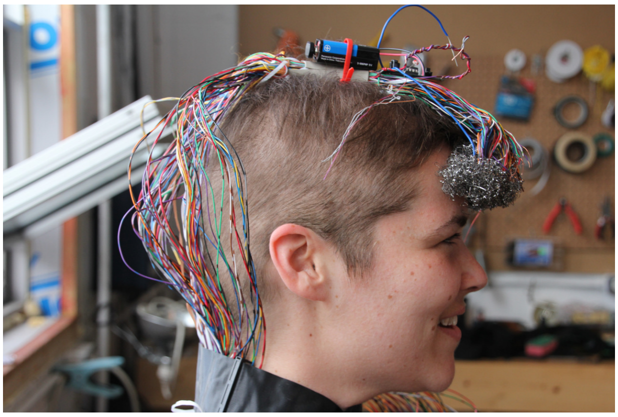
Construction
Essential tools required: soldering iron (typically 12 – 25 watts with a fine tip), lead free solder, and wire cutters. Solder the DIL socket (notch facing upwards), resistors (R1 – R6), capacitors (C1 – C7) (watch polarity +/- of C6 and C7), audio-jack socket (off diagram) and battery holder. Take care that the audio-jack is flush (feet fully inserted) against the board (tight fit). Stick the rubber feet in the four corners on the back of the board. Insert IC1 (notch facing upwards) into DIL socket, and battery into holder. The copper etching will tarnish and oxidise, and may be cleaned with metal polish.

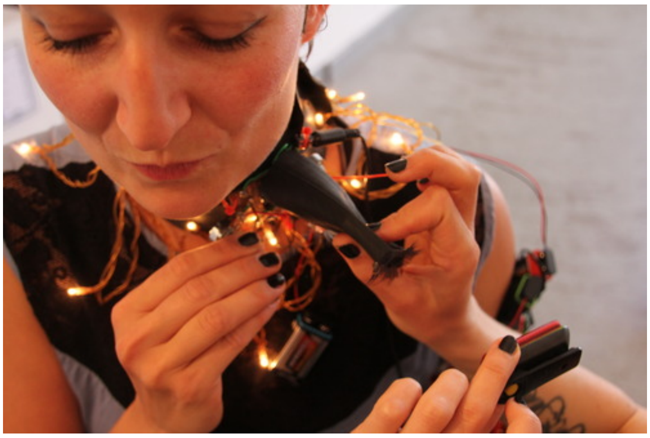
Part List

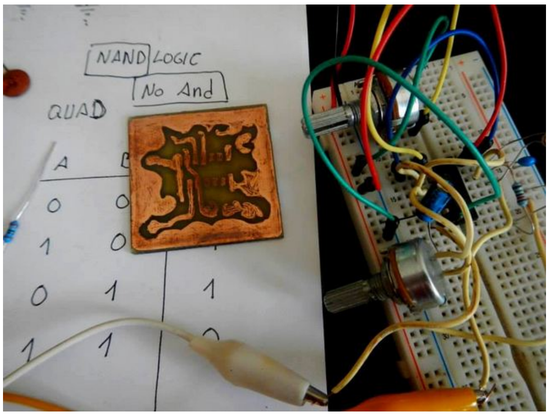
C1	0.1uF	R4	10k
C2	0.1uF	R5	100k (br/blk/blk/org/br)
C3	0.1uF	R6	100k
C4	0.1uF		
C5	0.1uF		
C6	10uF	PCB	skull etching PCB
C7	47uF	CR2032	3v coin cell battery
IC1	4049N	BAT1	CR2032 battery holder
DIL	DIL socket (16 pin)	FEET	rubber feet x4
AUDIO JACK	jack socket (3.5 mm)		
R1	10k (br/blk/blk/red/br)		
R2	10k		
R3	10k		

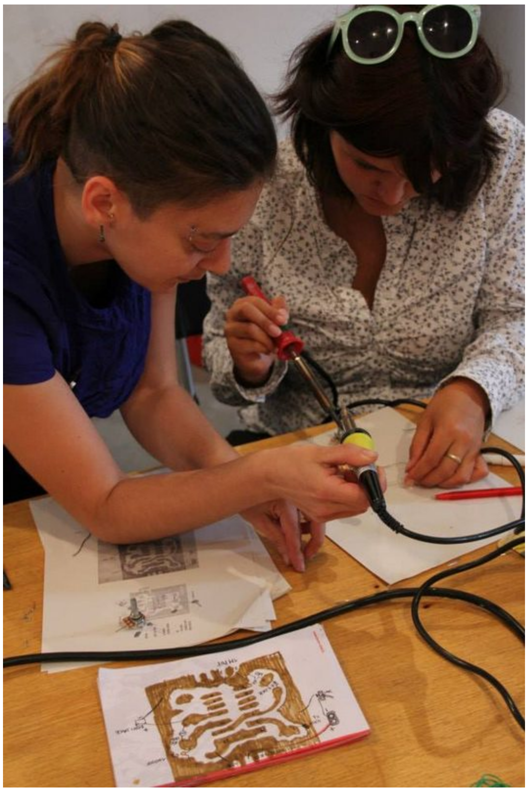
Part List for one synth :

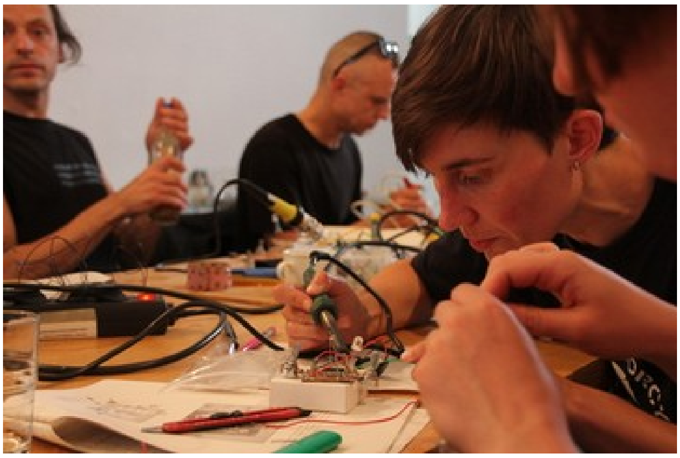
5 pieces 0,1 uF
1 piece 10uF electrolitic
1 piece 47uF electrolitic
4 pieces 10K resistors
2 pieces 100k resistors
1 piece jack socket 3.5 mm
1 piece CR2032 3volt cell battery
1 piece CR2032 battery holder
1 piece of potosensible PCB
If we want to make 10 pieces all plus 10






NAND LOGIC
No And
QUAD
A
B
0 0
1 0
0 1 1
1 1





[transhackfeminist, free technologies, free open body, situated knowledge, glams, biopunk, DIY/DIT, Calafou, cyborg witches]

http://jellypin.hotglue.me/
https://network23.org/pechblendalab/
http://pechblenda.hotglue.me/ https://calafou.org/

http://zoiahorn.anarchaserver.org/micromacropleasure/2015/06/27/hardglam-concept/

http://transnoise.tumblr.com/

http://biosensing.tumblr.com
http://akelarrecyborg.tumblr.
http://hackteria.org/

Akelarres Cyborg y **workshop The body as a post gender instrument.**
(Quimera Rosa y Transnoise)